

FIG. 1A

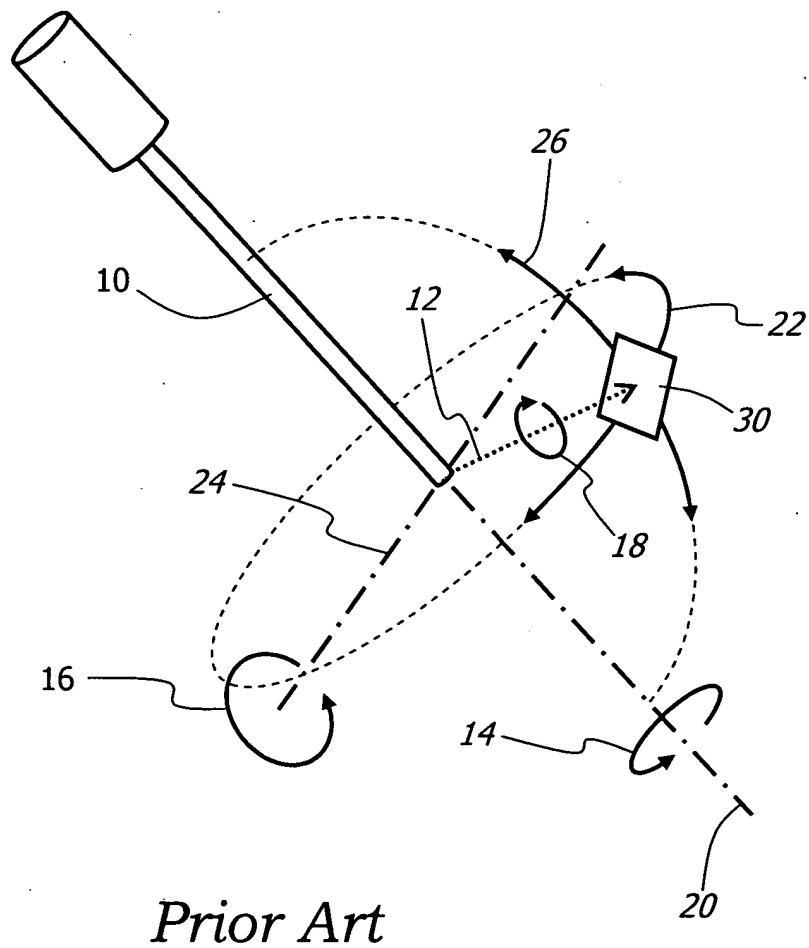
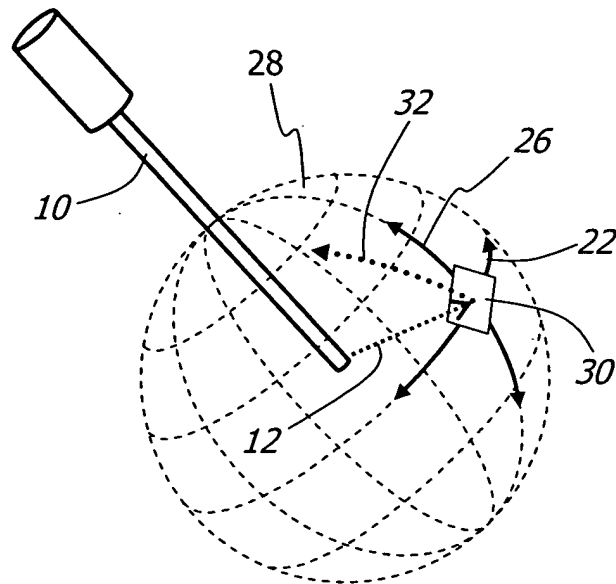
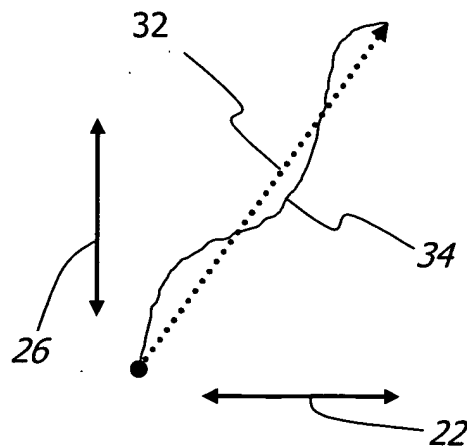


FIG. 1B



Prior Art

FIG. 1C



Prior Art

FIG. 2

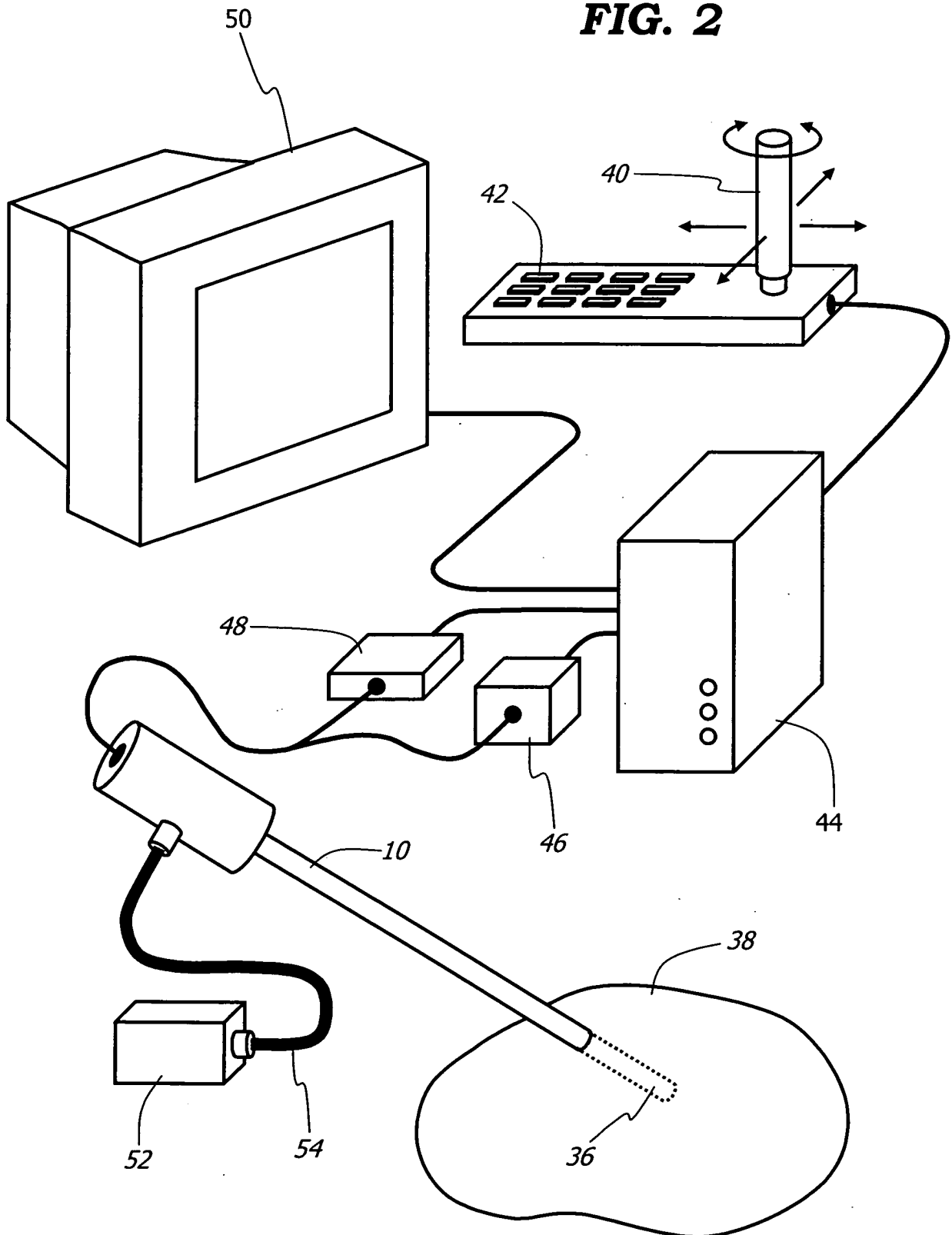


FIG. 3A

$$R_s(\theta_s, \phi_s, \zeta_s) = \begin{bmatrix} \cos \theta_s & -\sin \theta_s & 0 \\ \sin \theta_s & \cos \theta_s & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \cos \phi_s & 0 & \sin \phi_s \\ 0 & 1 & 0 \\ -\sin \phi_s & 0 & \cos \phi_s \end{bmatrix} \begin{bmatrix} \cos \zeta_s & -\sin \zeta_s & 0 \\ \sin \zeta_s & \cos \zeta_s & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

FIG. 3B

$$R_c(\theta_c, \phi_c, \zeta_c) = \begin{bmatrix} \cos \theta_c & -\sin \theta_c & 0 \\ \sin \theta_c & \cos \theta_c & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \cos \phi_c & 0 & \sin \phi_c \\ 0 & 1 & 0 \\ -\sin \phi_c & 0 & \cos \phi_c \end{bmatrix} \begin{bmatrix} \cos \zeta_c & -\sin \zeta_c & 0 \\ \sin \zeta_c & \cos \zeta_c & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

FIG. 3C

$$W = \begin{bmatrix} 0 & -Z & Y \\ Z & 0 & -X \\ -Y & X & 0 \end{bmatrix}$$

FIG. 3D

$$R_c W R_c^T = \dot{R}_s R_s^T$$

FIG. 3E

$$\cos\theta_c(Y\cos\zeta_c + X\sin\zeta_c) + \sin\theta_c(Z\sin\phi_c + \cos\phi_c(X\cos\zeta_c - Y\sin\zeta_c)) = \dot{\zeta}_s \sin\theta_s \sin\phi_s + \dot{\phi}_s \cos\theta_s$$

FIG. 3F

$$-\sin\theta_c(Y\cos\zeta_c + X\sin\zeta_c) + \cos\theta_c(Z\sin\phi_c + \cos\phi_c(X\cos\zeta_c - Y\sin\zeta_c)) = \dot{\zeta}_s \cos\theta_s \sin\phi_s - \dot{\phi}_s \sin\theta_s$$

FIG. 3G

$$Z\cos\phi_c + \sin\phi_c(-X\cos\zeta_c + Y\sin\zeta_c) = \dot{\zeta}_s \cos\phi_s + \dot{\theta}_s$$

FIG. 4

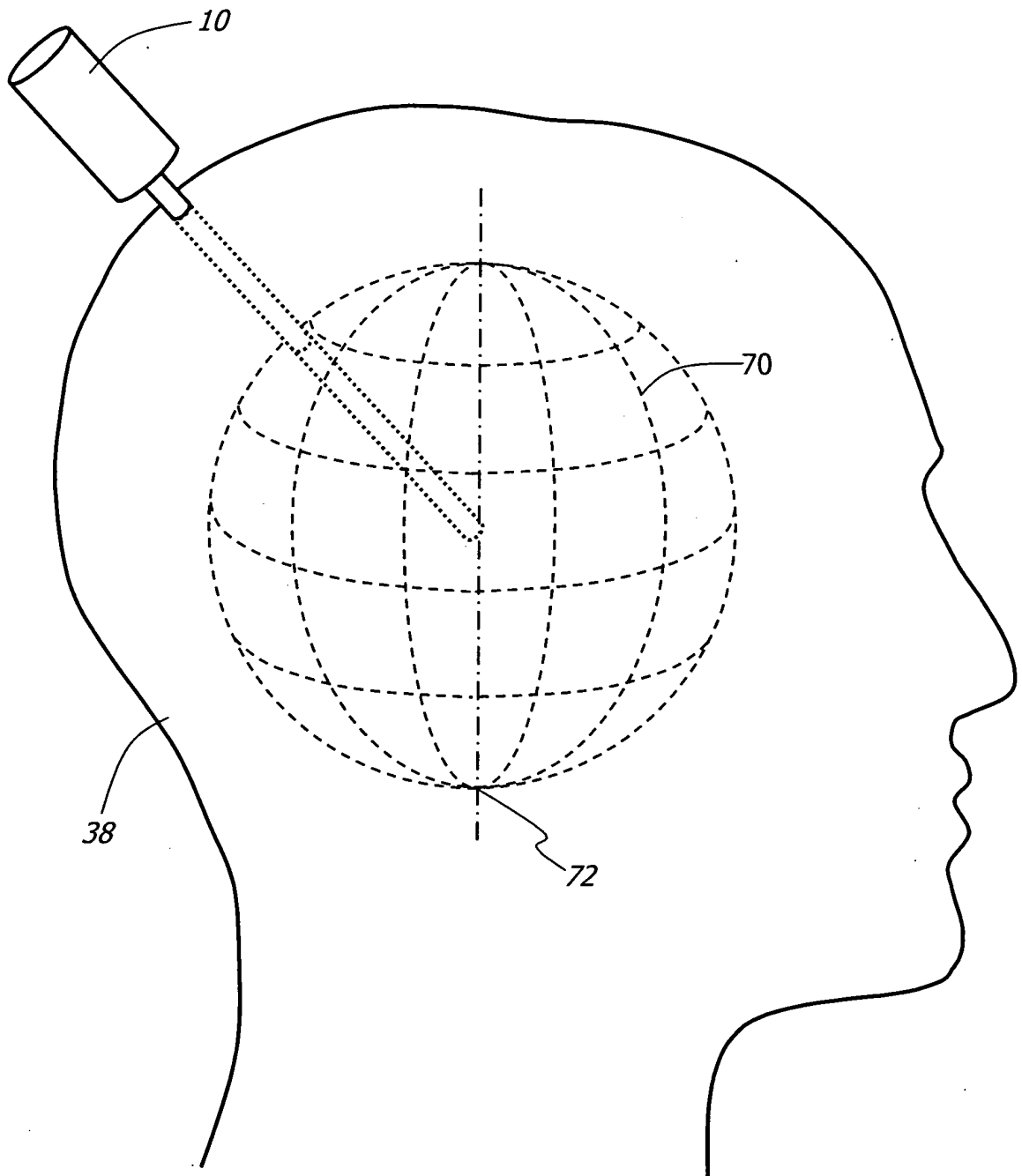


FIG. 5

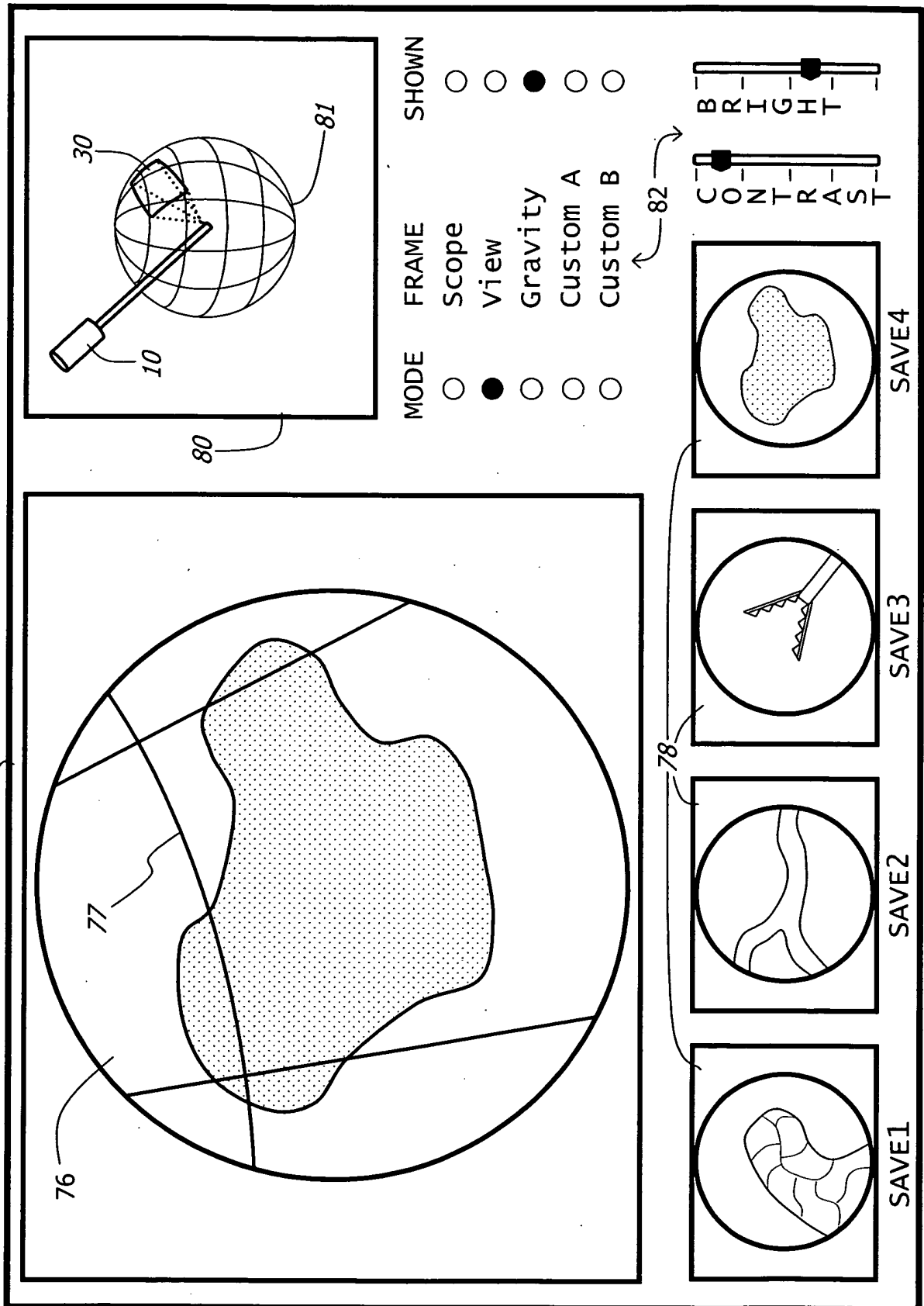


FIG. 6

